

MILLENNIAL

RESEARCH | ECONOMIC DEVELOPMENT | INNOVATION | INDUSTRY PARTNERSHIPS

OFFICIAL MAGAZINE OF THE CHARLOTTE RESEARCH INSTITUTE

ISSUE NO. 4 | WINTER 2012




UNC CHARLOTTE

 CHARLOTTE
RESEARCH
INSTITUTE



THE CHARLOTTE RESEARCH INSTITUTE | CRI CAMPUS

The Institute's campus, a geographically distinct part of the University of North Carolina at Charlotte, was created in 2002 to further the university's teaching, research, and service mission as well as to enhance the economic development of the region. The CRI campus is a Millennial Campus, as defined by North Carolina legislation, and offers special opportunities for collaboration with private sector partners. In particular, partner companies may contract for use of research capabilities or facilities on the Millennial Campus, contract for sole-use space, and construct and manage privately owned buildings. The Charlotte Research Institute manages all activities of the Millennial Campus.

“NEVER FORGET”

ON SEPTEMBER 11, 2011

UNC Charlotte recognized the 10th Anniversary of the attacks on the World Trade Center. A memorial is located near Duke Centennial Hall commemorating this event. The memorial incorporates a piece of the world trade center tower. (Fragment from Tower 1) →



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The cover design is a graphic representation of the innovation cycle that drives the global economy. The University of North Carolina at Charlotte Office of Research and Economic Development, Charlotte Research Institute, Ben Craig Center, Inc. and the UNC Charlotte Office of Technology Transfer all collaborate to propel Innovation in Action. These entities work together as catalyst for job creation through their daily activities and their local, national and global initiatives. Cover background global image © Flavio Takemoto

Letter from the Executive Director

With this issue, Millennial shows a snapshot of the things we do at UNC Charlotte to translate knowledge and research results into new products, processes, therapies and the like to impact our economic community.

To the right you see me pointing to the construction we have completed on the CRI Millennial campus as I speak of our future plans for the PORTAL building (Partnership, Outreach and Research to Accelerate Learning). We continue to expand the CRI campus while our most significant progress, of course, is in the large number of talented researchers and students that are attracted to UNC Charlotte.

Research is fundamental to the mission of UNC Charlotte. New knowledge and creative works change the world and shape the future of the University.

Research & Economic Development at UNC Charlotte strives to advance the quality, diversity and growth of research at UNC Charlotte. We place a special value on the translation of research results that impact our social, cultural and economic communities.

The Charlotte Research Institute, Technology Transfer, our business incubator and entrepreneurship programs all play a strong role in our research and translation efforts.

Thanks for your interest in UNC Charlotte, CRI, and our research initiatives. We hope you will bring your ideas to UNC Charlotte and work with us to create even more compelling results.

Cordially,

Bob



Robert G. Wilhelm, PhD.
Vice Chancellor for Research & Economic Development
Executive Director, Charlotte Research Institute
The University of North Carolina at Charlotte







EPRRSD

3rd International Joint Topical Meeting
on Emergency Preparedness & Response
and Robotics & Remote Systems

13th Robotics & Remote Systems for Hazardous Environments • 11th Emergency Preparedness and Response



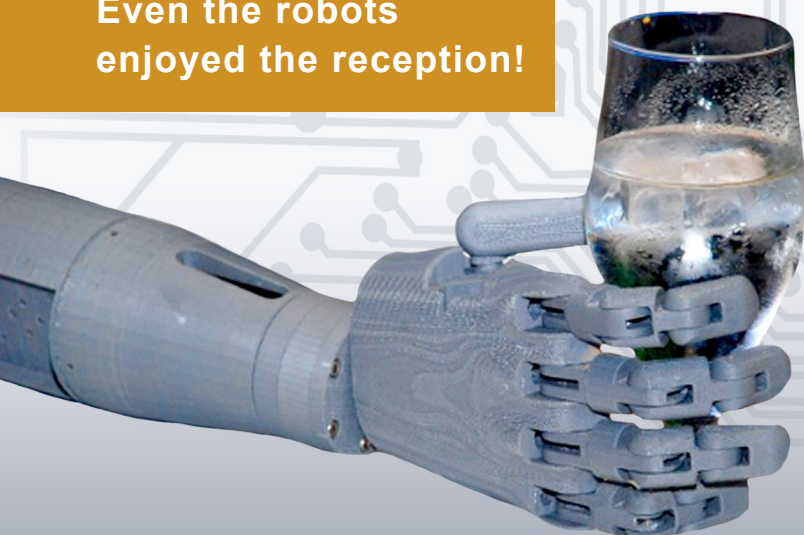
EMERGENCY MANAGEMENT & ROBOTICS FOR HAZARDOUS ENVIRONMENTS

CRI SPONSORS INTERNATIONAL CONFERENCE ON EMERGENCY PREPAREDNESS AND ROBOTICS

CRI partnered with the American Nuclear Society, University of Tennessee and Oak Ridge National Laboratory (ORNL) to sponsor the Third Joint International Conference on Emergency Preparedness and Response and Robotics for Hazardous Environments. The conference, held in Knoxville, TN, August 7-10, 2011, attracted more than 160 participants from nine countries to hear 120 technical presentations plus keynote presentations. Highlights included an overview of the use of remote systems to cap the 2010 oil well leak in the Gulf of Mexico; a review of events that caused the March 2011 Fukushima reactor disaster; the progress made toward stabilization of that facility and an overview of technologies developed for search and rescue robots. In addition to the technical tracks the conference sponsored a Sumo Robotics competition in

which more than 60 middle school students vied for cash prizes totaling \$2000. Best graduate student papers were recognized with more than \$1000 in cash prizes. Dr. Jing Xiao of the UNC Charlotte College of Computing and Informatics chaired a session on "Safety, Security and Rescue Robots" including presentation of technologies developed at UNC Charlotte. The conference also featured an exhibit hall where university and industry representatives demonstrated remotely operated and robotic equipment for nuclear industry and emergency response. Two technical Divisions of the ANS, Robotics and Remote Systems Division and the Environmental Science Division, joined with the ORNL Section to provide most of the volunteer effort to organize the conference under the leadership of the conference General Chair, Dr. Barry Burks, associate director of CRI.

Even the robots
enjoyed the reception!





CRI, IDEAS Center and UNC Charlotte Center for STEM Education Partner with Catawba River District on Education Initiatives

The Catawba River District has organized a cadre of partners to develop novel Science Technology Engineering and Mathematics (STEM) learning opportunities for elementary and middle school students in the vicinity of the ReVenture Park (see list). Several organizations at UNC Charlotte are active in this collaboration including CRI, the Infrastructure, Design, Environment and Sustainability (IDEAS) Center, and the Center for STEM Education. The Catawba River District K-20 Learning World proposes to develop STEM learning modules on the campus at ReVenture Park and also on the campuses of seven elementary schools and two middle schools. Other partners include the Charlotte Mecklenburg School System, Discovery Place, Industrial Extension Office of NC State University, NC State Parks System and other individuals and organizations volunteering time and resources. Three UNC Charlotte faculty/staff are active on the steering board for the Catawba River District K-20 Learning World: Dr. Barry Burks, CRI associate director; Dr. Helene Hilger, director of the IDEAS Center; and Dr. Alisa Wickliff, assistant director of the Center for STEM Education. In addition, Dr. David Pugalee, director of the Center for STEM Education is leading the effort to obtain funding for implementation of the learning modules.

Schools serving students in the Catawba River District

Elementary schools

- Catawba Heights Elementary (Belmont)
- Ida Rankin Elementary (Mt Holly)
- J.B. Page Elementary (Belmont)
- Mt. Island Elementary (Char-Meck)
- Pinewood Elementary (Mt Holly)
- River Oaks Academy (Char-Meck)
- Whitewater Academy (Char-Meck)

Middle schools

- Belmont Middle (Belmont)
- Coulwood Middle (Char-Meck)

In a separate but related effort UNC Charlotte (IDEAS Center and Center for STEM Education) provided support in the form of environmental science learning stations at an Outdoor Learning Fair held at the US National Whitewater Training Center on the weekend of September 23-24, 2011

STEM



NORTH CAROLINA
DEFENSE BUSINESS ASSOCIATION

BUILDING THE NORTH CAROLINA DEFENSE INDUSTRY TOGETHER

OCTOBER 19, 2011

**BREAKFAST WITH A PRIME
EVENT SPONSORED BY**



SAVE THE DATE

NC DEFENSE OPPORTUNITIES WORKSHOP

MARCH 29, 2012

Hosted by



UNC CHARLOTTE

For details contact William.Tolone@uncc.edu

On October 19, 2011 CRI hosted a breakfast and information meeting of the North Carolina Defense Business Association (NCDBA) that featured UNC System President Tom Ross, UNC Charlotte chancellor Philip Dubois, Vice Chancellor of Research and Economic Development, Robert Wilhelm, along with researchers from the UNC institutions that perform significant defense and security related research. Meeting attendees included a mix of university and private industry representatives. Dr. William Tolone provided an overview of UNC Charlotte capabilities and interest areas for collaboration with members of the NCDBA. Joy Thrash, executive director of the NCDBA, partnered with the UNC General Administration to organize this first ever opportunity for defense contractors to receive comprehensive information from the state universities detailing technical areas for collaboration. A follow up meeting has been organized for Thursday, March 29, 2012 that will allow defense agencies and defense contractors to focus more probing discussion on detailed partnership opportunities. This meeting will also be hosted at UNC Charlotte.



UNC System President Tom Ross

NANOTECH COMMERCIALIZATION CONFERENCE



**APRIL 4-5
2012**



North Carolina Office of
Science & Technology



COIN Center of Innovation for Nanotechnology



NanoBusiness
COMMERCIALIZATION ASSOCIATION



The 4th-Annual Nanotechnology Commercialization Conference (NCC), will be held in Durham, North Carolina on April 4-5, 2012. The NCC provides the premiere venue for networking with fellow professionals on the cutting edge of nanotechnology. The conference will feature: national-level keynote speaker sessions, workshops, and exhibits showcasing the latest advances in the field, discussions on financing, licensing, and business development geared toward the nanotech entrepreneur; sessions and exhibits showcasing cutting-edge research, products, and technologies; and networking opportunities with connected professionals. This conference is sponsored by the North Carolina Office of Science and Technology, the Center of Innovation for Nanotechnology, the NanoBusiness Commercialization Association, and the Small Business and Technology Development Center (SBTDC).

For more information regarding this conference visit: <http://www.nccommerce.com/scitech/ncc>

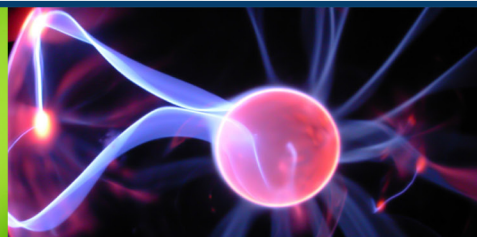
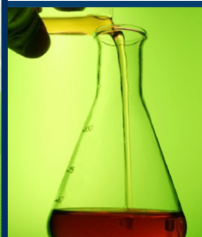
Photo © Sharlini Sankaran

Charlotte Science Expo 2012

Sunday, April 29, 2012



As part of the North Carolina Science Festival, UNC Charlotte will host a free public Science and Technology Expo on Sunday, April 29 from 11:00 am to 3:30 pm on the Education and Health and Human Services Mall (facing the Student Union). Life is Your Lab is the tagline for the statewide celebration of science scheduled for April 13-29, 2012 event, and the Festival's goal is to highlight the educational, cultural and financial impact of science in our state. Through hands-on activities, science talks, nature experiences, exhibits and performances, the Festival will engage a wide range of public audiences while inspiring the next generation of scientists. The UNC Charlotte Science and Technology Expo is being sponsored by CRI and the Office of Research and Economic Development. For questions and more information (including queries from faculty interested in contributing activities), contact Jim Hathaway at CRI, at 704.687.5743 or jbhathaw@uncc.edu. For more information on the 2012 North Carolina Science Festival, see <http://www.ncsciencefestival.org>.



CLOSE



Identifying and pursuing a vision and mastering relationship building techniques are two important components to achieving goals in one's personal life and career choice. It's been said you can't have everything, but Clare Cook Faggart works to achieve both.

As the daughter of Willis Hosiery Mills, Inc. owners, Mr. Eugene "Gene" Clark Cook and Suzanne Willis Cook, Clare worked and trained in the textile industry where she gained valuable business acumen while being nurtured in an environment which allowed her to make her own personal life and business decisions. She attended Salem College in Winston Salem, NC for two years majoring in voice performance, then changed her focus from pursuing a liberal arts career and enrolled at The University of NC at Charlotte, finished her degree (in business) and took graduate courses in accounting to further her business knowledge.

From 1990 until 2001, Clare served as the president and COO of her family's business, overseeing operations in a plant spanning nearly 76,000 square feet. There she managed 300 dedicated employees who produced high-end custom hosiery products for such brands as Liz Claiborne, Jones of New York, IZOD, The Gap and a private label for Marie Gray's exclusive St. John Knits, to name a few.

In 1999 Clare became the first female chairperson of the International Hosiery Association due in part to her vision for the association's future and her steadfast focus for sharing knowledge and innovative technology

with business connections and suppliers. She saw the future where a constantly changing marketplace could affect hosiery manufacturing and recognized the importance of being receptive to identifying new products and technology innovations. With her keen insight, during her tenure at Willis Hosiery Mills, Clare made the decision to move away from contract work for other hosiery mills and focus on manufacturing, marketing and distributing proprietary products. She utilized sophisticated technology to diversify the mill's product line, thus softening the blow of adverse economic conditions. For these efforts the mill earned \$10 million in annual sales, until the company closed in 2001.

Named one of the top women in business by the Charlotte Business Journal in 2000, Clare was honored for her focus on helping people succeed by drawing on her experiences to build connections and to strengthen networks. These attributes, along with her talent for relationship building represent a solid foundation for her move to UNC Charlotte and her vision to connect business, research and academia.

After a short period of working to help the North Carolina Biotechnology Center establish their Charlotte regional office, Clare joined the Charlotte Research Institute and became more involved with its research-based initiatives. Clare currently serves as the Life Sciences Program Manager for the Charlotte Research Institute and her office is located at the David H. Murdock Core Lab on the NC Research Campus in Kannapolis.

UP

CLARE COOK FAGGART

LIFE SCIENCES PROGRAM MANAGER

Some of her major responsibilities are the successful management of the Charlotte Biotechnology Conference, planning and implementing the Life Science and Distinguished Lecture Series and assisting with the planning and producing of the Charlotte Venture Challenge program that is being introduced this spring as a replacement for the annual Five Ventures business plan competition. By leveraging her business development and entrepreneurial skills Clare works to encourage collaboration between the UNC Charlotte, North Carolina Research Campus, and the entrepreneurial and biotechnology communities.

Clare is a well respected business woman who leverages her business development, entrepreneurial, and people skills to help the Charlotte Research Institute link research to the surrounding community. Clare's work ethic, dedication, and management expertise make her one of the Charlotte Research Institute's shining stars.

Want to know more about the Charlotte Research Institute and UNC Charlotte research activities at the NCRC Campus, contact Clare at: (704) 250-5760 or email at clarefaggart@uncc.edu

“IN THIS DIGITAL AGE OF
TECHNOLOGY WONDERMENT,
NEVER FORGET THE POWER OF
FACE TO FACE CONVERSATION
AND COLLABORATION.”





Dr. Leroy Hood

TENTH ANNUAL

2011 C H A R L O T T E
B I O T E C H N O L O G Y
C O N F E R E N C E

CELEBRATING 10 YEARS OF BIOTECHNOLOGY IN THE GREATER CHARLOTTE REGION

The Charlotte Research Institute (CRI) at UNC Charlotte presented the tenth annual Charlotte Biotechnology Conference on Thursday, October 27, 2011 at the UNC Charlotte Barnhardt Student Activity Center. Over three hundred attendees filled the salons to celebrate a special anniversary—ten years of pursuing a mission to provide an overview of current activities and opportunities; within the university, research, business, investment and economic development sectors—always a thought-provoking, highly informative and inspiring cornerstone event for the at-large Charlotte biotechnology community. Dr. Leroy Hood, president and co-founder of the Institute for Systems Biology (Seattle, WA) and pioneer in the systems approach to biology and medicine, presented the keynote address at the conference. A pillar in the biotechnology field, Dr. Hood's research focuses on the study of molecular immunology, biotechnology and genomics. Hood has played a role in founding more than fourteen biotechnology companies. He is a member of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. Dr. Hood is one of only fifteen people out of the more than 6,000 scientists world-wide who belong to one or more of these academies, that has been accepted into all three.

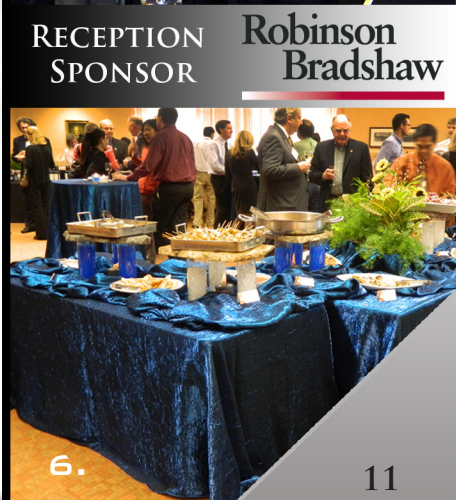


Dr. Cynthia Nevison

Dr. Cynthia Dale Nevison provided a closing keynote presentation entitled “Biotechnology and the Global Carbon and Nitrogen Cycles” highlighting both the commonly recognized global climate impact of carbon buildup in the atmosphere and the less touted but potentially more severe impacts of nitrogen. Nevison is Research Scientist at the Institute for Arctic and Alpine Research at the University of Colorado, Boulder.

In conjunction with the Charlotte Biotechnology Conference, the Graduate Student Poster Competition was again an excellent showcase of the region’s top graduate students scientific research projects and collaborations. The competition is open to any graduate student currently enrolled in regional universities and conducting “biotechnology” research with the potential for commercialization. Research areas may include, but are not limited to: biomedical engineering, biology, nanotechnology, bioimaging, bioinformatics, nutritional science, and disease research. Finalists were selected and asked to present their posters to a review committee consisting of scientific advisors, business development experts, and private equity investors.

The 2011 Grand Prize Winner and recipient of \$1000 was Deepika Poranki from Wake Forest University. Second place with a cash prize of \$500 went to Sritama Nath of UNC Charlotte. Two \$250 runner-up prizes went to UNC Charlotte students, Stephen Rego and Regina Vrikkis. The Charlotte Biotechnology Conference provides insight from some of the most recognized biotechnology, business and research professionals from around the world and the goal is to highlight regional opportunities and investment trends within the local biotechnology sector. Each conference ends with a reception to thank the sponsors. Robinson, Bradshaw & Hinson sponsored the Tenth Anniversary reception. Planning for the 2012 conference is already in the works. For more information on the Charlotte Biotechnology Conference please visit www.charlotteresearchinstitute.com.



1. Clare Faggart (Biotech Conference project manager) and Julie Fulton (CRI office manager)
2. Lolita Gonzales (CRI Campus Business Office Specialist) and Ruth Burnett (Office of Technology Transfer associate director and founding Biotech board member)
3. Student Volunteers from the UNC Charlotte Association of Biology Graduate Students
4. Dr. Martin Klotz (UNC Charlotte Biology Department Chair)
5. 2011 Grand Prize Winner Deepika Poranki (Wake Forest) Dr. Barry Burks (CRI associate director) and Dr. Sheetal Ghelani (Chair of NC BioConnect)
6. Biotech Conference VIP Reception (Sponsored by Robinson, Bradshaw & Hinson, P.A.)



UNC CHARLOTTE STAKE YOUR CLAIM

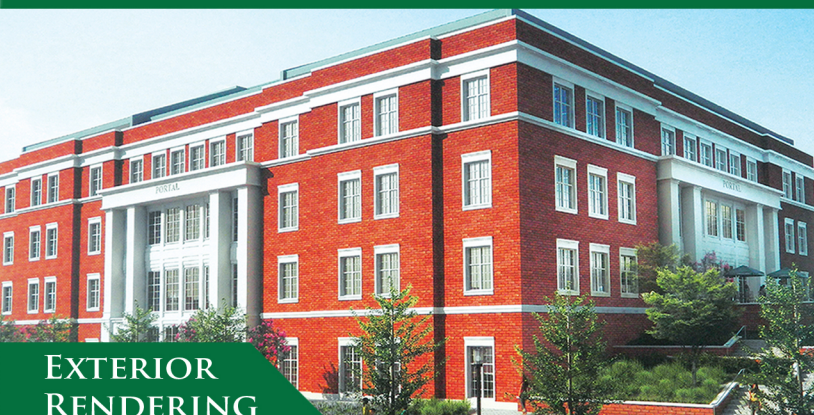
Vice Chancellor,
Bob Wilhelm

BCC Chairman,
Doug Dawson

PORTAL GROUNDBREAKING CEREMONY



PARTNERSHIP OUTREACH AND RESEARCH TO ACCELERATE LEARNING



On December 15, 2011, Vice Chancellor Bob Wilhelm and Ben Craig Center Board Chairman Doug Dawson officially broke ground for UNC Charlotte's PORTAL building (Partnership, Outreach and Research to Accelerate Learning). The November celebration of the Ben Craig Center's 25th anniversary is followed within one month by the PORTAL groundbreaking. Why make the change to a new location on campus?

The existing incubation efforts have been effective, but much more is needed. The concept is to bring together the brainpower that creates new ideas and inventions with the risk-taking, business-savvy entrepreneurs who bring innovations to the marketplace. This will build the growth companies that generate jobs, wealth, and an improved standard of living.

The PORTAL building reflects the University of North Carolina at Charlotte's commitment to university-industry partnerships with particular emphasis on innovation-based entrepreneurship, business growth and job creation. Construction of this new building increases greatly the capacity to locate private sector

businesses within easy access to the students, faculty and specialized facilities of the university. The building will provide a focal point for entrepreneurship initiatives and a campus presence for more mature businesses as well, including those that require access to secure facilities for defense and security projects. PORTAL will provide the physical setting for new forms of collaboration across disciplines. It will enable increased student entrepreneurial engagement and will be a place where we can experiment with innovative approaches to commercialization and venture creation. PORTAL can be the catalyst for the Charlotte region to emerge as a 21st century magnet for innovation-based entrepreneurs. And, that will surely lead to future celebrations!

Attendees of the PORTAL Groundbreaking Ceremony:

1. Dr. Robert Johnson, dean of the William States Lee College of Engineering (left) and Dr. Johan Enslin, director of EPIC (right)
2. Dr. Dhanonjoy Saha, CMC Research Administration (left) and Dr. Steve Mosier (right)
3. Mr. Manwell Bynum, manager & founder of Connectivity Concepts, LLC (left) and Mrs. Eulada Watt (right)
4. Mr. Jarret Burr, SGA chief of staff (left) and Mr. Dave Craven, SGA president (right)

Bottom picture (pg. 12) from left to right:
Ben Craig Center Board Chairman, Doug Dawson
Chancellor Philip Dubois, Vice Chancellor Bob Wilhelm,
Ben Craig Center President Paul Wetenhall



SAVE THE DATE APRIL 19, 2012

For more information about Charlotte Venture Challenge please contact Devin Collins at devin.collins@uncc.edu

WWW.CHARLOTTEVENTURECHALLENGE.COM

The UNC Charlotte Five Ventures business plan competition has a new name: Charlotte Venture Challenge. In 2012, the Five Ventures Business Innovation Competition underwent a name change in order to brand the competition in the Charlotte region and identify Charlotte as an innovation center. The 2012 Charlotte Venture Challenge (CVC) has drawn significant support from businesses and organizations in the community that has grown the competition.

The competition will have 6 different tracks:
New Energy & High Tech | IT & Informatics Life Sciences & Biotechnology
Consumer Product & Services
Student Ventures | Social Enterprises

CVC will be announcing some significant prize packages at the end of January. If you are interested in applying, applications are due February 29, 2012.



InnoVenture helps you

**discover and develop
new business opportunities**
by connecting you with the customers, capital, talent and technology that
you need to succeed.

MAY 8-9 2012

At the Innoventure 2012 Conference participants will discover new business opportunities by connecting with customers, capital, talent and technology. Those attending will have the opportunity to connect with influential people who can be referral sources and learn from a large community of innovators. The conference is organized on a distinctive web-based social business development platform so attendees can connect with each other and also with other like-minded colleagues from elsewhere. During the 2012 Conference the Przirembel Prize will be awarded recognizing collaborations across diverse organizations in the Southeastern United States as being significant by those outside the region. The Prize promotes best practices in open innovation and builds a greater sense of identity of the Southern United States as an innovation Powerhouse in the world. In 2011 CRI was recognized with an honorable mention award for the First Annual Przirembel Prize.

 **Przirembel Prize**

For more information about the InnoVenture 2012 Conference please visit: www.innoventurecommunity.com

INNOVATION IN ACTION: OFFICE OF TECH TRANSFER

"If you are someone who enjoys technology, this is the best job in the world." - Carl Mahler II



Carl Mahler II

The Office of Technology Transfer (OTT) at The University of North Carolina at Charlotte enhances the research endeavors of the University and the entrepreneurial ecosystem of the Greater Charlotte community as a vital link in UNC Charlotte's innovation cycle. Led by Carl Mahler II, executive director of UNC Charlotte's Office of Technology Transfer, OTT continues to enter new and successful heights with a staff of four.

Mahler described the philosophy (or priorities) of the UNC Charlotte Office of Technology Transfer as serving an integral and contributing part of the research organization at UNC Charlotte. Its primary focus is on relationship building between researchers, the university and the community. The office assists the university by working with companies on UNC Charlotte research initiatives by helping to move inventions out of the university and into general use in society.

OTT is involved early in the research process to identify and protect intellectual property (IP) and continue involvement for the commercialization of inventions through the final stage of research. Mahler said, "OTT staff makes a deliberate effort to ensure that OTT activities don't jeopardize research and teaching activities."

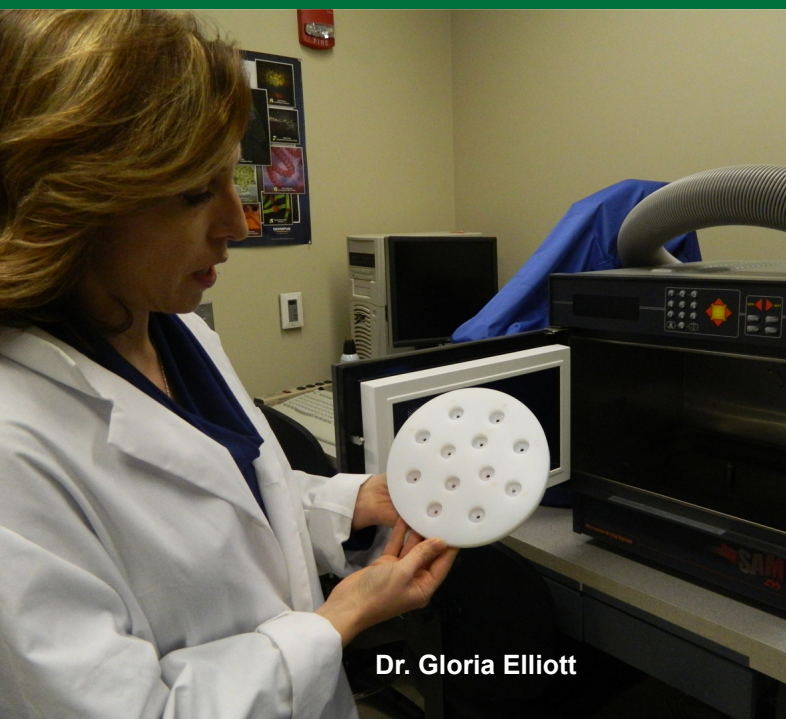
The staff assists researchers in explaining what opportunities are available and defining how to move forward. Two tools provided in this process are confidentiality agreements and research agreements. With these tools, OTT advises researchers regarding whether it would be cost effective to spend money to patent, market and commercialize.

Mahler explains that OTT's educational focus with companies and institutions outside the university is to help them understand why and how dealing with the

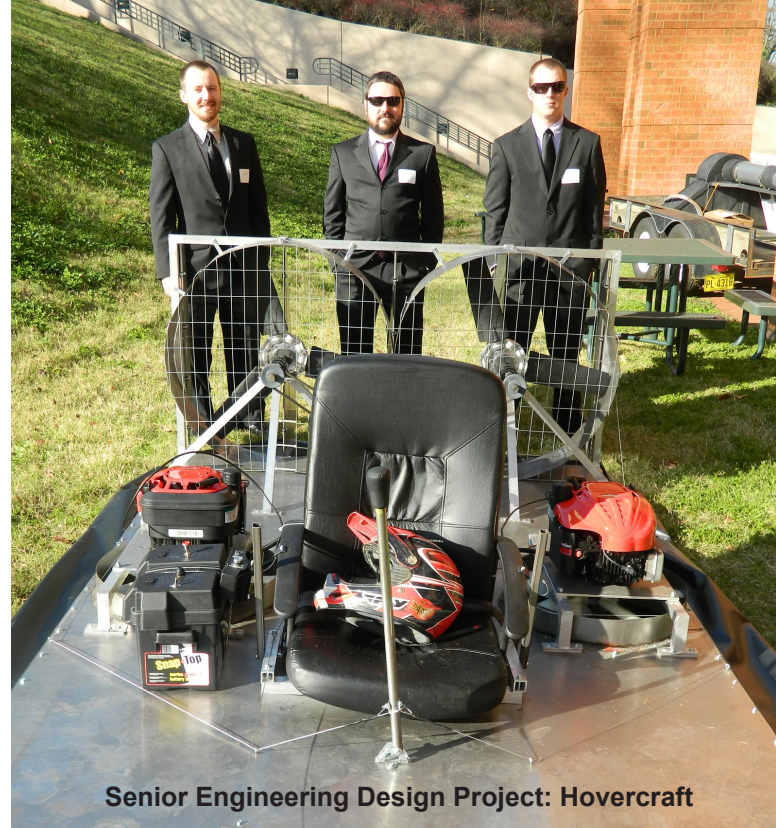
university is different from dealing with “for-profit” companies, and how everyone can move toward a common agenda and create a win-win scenario.

Through the efforts of the Charlotte Research Institute in working with new companies and innovators moving into the Charlotte area and partnering with OTT on initiatives that could affect their operations, CRI is active in providing funding assistance to OTT for its mission. The recent purchase of a database system for tracking inventions and licenses, as well as providing funding for fabrication of prototype inventions made by university researchers are examples of CRI’s dedicated partnership. Fabrication of prototypes is prioritized based on high potential for commercialization. An example of the prototype fabrication initiative is given below.

CRI and OTT funded building a proof-of-concept prototype of the “near room temperature” storage system for biological tissues invented by Dr. Gloria Elliott which lead to a collaboration with the Smithsonian. This system requires less refrigeration than conventional tissue preservation technology. This invention could revolutionize research in the storage of sperm and eggs, as well as umbilical cord blood. Not only does this technology save money on refrigeration it enables storage of tissues in settings where refrigeration is not available.

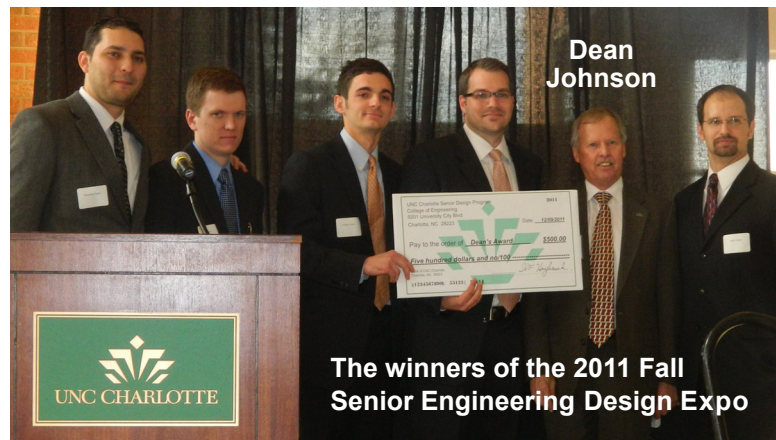


Dr. Gloria Elliott



Senior Engineering Design Project: Hovercraft

In addition to leveraging university resources such as facilities and software OTT capitalizes on student ingenuity. An example involves the Engineering Senior Design Program at UNC Charlotte where senior undergraduate students work in teams for two semesters to solve design problems defined by industry sponsors and faculty researchers. During the final semester of these projects designs are rendered into practice as either prototypes, scale models or full scale products.



Dean Johnson

The winners of the 2011 Fall Senior Engineering Design Expo

First Place Team featured with Dr. Robert Johnson (Dean of the College of Engineering) won for their “Renewable, Sustainable and Transportable Micro-Source for Smart Grid Applications. The scope of their project is to design, test, and construct a modular transportable renewable, sustainable microsource that retains plug-and-play capabilities.

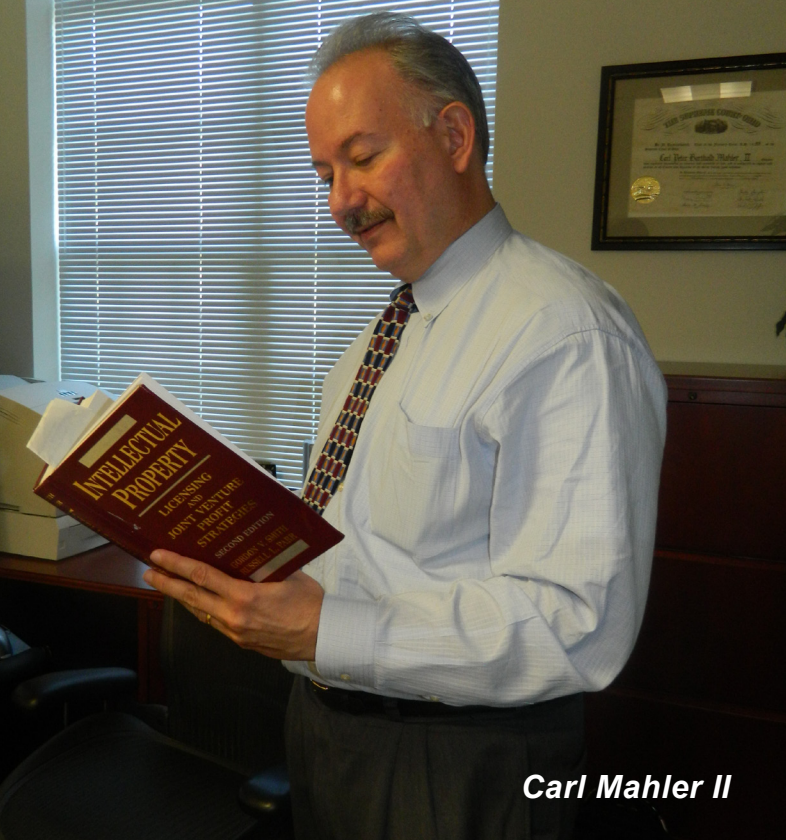
The office of OTT has assisted with several breakthroughs such as this despite the looming challenges. Many technology transfer offices at universities and businesses have experienced a decreased budget and lack of fiscal resources since 2007. UNC Charlotte's OTT has the same patent budget it did four years ago, but the cost of patenting is steadily rising. The financial constraints to file patents pose challenges due to a shift in the type of research conducted, and the growth of research initiatives.

At UNC Charlotte there is a heavy focus on mechanical engineering research. In 2010 R&D Magazine awarded UNC Charlotte Precision Metrology researchers, in collaboration with BWXT Y-12, with the coveted R&D 100 award, recognizing them in the development of the "Modulated Tool-Path (MTP) Chip Breaking System" (a sophisticated new method that eliminates the formation of long, dangerous strips of metal "chips" in the process of machining ductile materials).

While mechanical engineering research maintains a steady growth pace of intellectual property there is an increased focus in the fields of Bioinformatics and Genomics. UNC Charlotte is well on the way to establishing the largest Bioinformatics department in the United States.

As more and more high-tech inventions come to the table, the cost of commercializing technology goes up. To address the financial dilemma, more access to capital is required and more Venture Capitalist and Angel Investor involvement is needed. OTT works with several local Angel Investor groups to fund startups. In addition to leading the patent and licensing processes for the university, OTT works to find experienced business people to run and manage the startup companies in order to complement the researcher(s). The Ben Craig Center (see page 20) is focused more on startups and serves as a partner to offer advice to researchers on business aspects (if they are considering a startup company).





Carl Mahler II

UNC Charlotte's Office of Technology Transfer prides itself on maintaining a businesslike and respectful relationship with their partners by responding to them in a timely manner, taking the time to get to know them and their concerns, and explaining OTT's concerns upfront so that they can work together to address them appropriately. Mahler acknowledged they focus on "building a relationship, rather than making a deal."

To support their relationship building focus, OTT puts successful strategies into practice to center on licensing to existing companies in addition to creating startups and to provide sufficient guidance for the OTT staff to utilize training opportunities from two major United States Tech Transfer organizations: AUTM and LES (Licensing Executives Society™).

Ruth Burnett, associate director of UNC Charlotte's OTT and a certified paralegal and notary, is well connected with AUTM and participates in their annual meeting to stay informed about the latest advancements in Tech Transfer. Office Manager, Andy Gonzales, attends AUTM training to keep current regarding opportunities and to learn a dedicated understanding of the patent process that focuses on back room operations of a Tech Transfer organization.

Mahler and assistant director, Brad Fach, are members of the LES and have completed the CLP (Certified Licensing Professionals) Designation Program. This is significant considering there are only about 700 people in the United States with CLP Designation. Carl and Brad are the only two people in the UNC system that have acquired this CLP designation.

As UNC Charlotte expands its student and faculty populations, as well as its research capacity, The Office of Tech Transfer is preparing by updating the University's policies to sustain future growth and increasing demand for intellectual property. OTT is managing this increased demand by helping to attract funding and experienced startup management expertise by selectively slowing down the spin-off process to improve the quality of the startup companies, and by utilizing the services of campus and community partners such as the Charlotte Research Institute (CRI) and the Ben Craig Center, Inc.



UNC Charlotte spinoff company InfoSense is an award winning company, receiving a Fall 2011 NC Idea grant. InfoSense is a cleantech startup that makes a novel acoustic sensing technology for the wastewater collection industry. The technology drastically improves the efficiency of assessing pipes for blockages. The company's gateway product provides a simple blockage assessment in less than three minutes and for a cost less than one tenth that of existing alternatives.

Pictured (from left to right): George Selembo (CEO), Alex Churchill (COO) and Ivan Howitt (President/CTO)

PATENT #	DATE	INVENTOR(S)
8,065,089	11/22/11	Kayvan Najarian Methods and Systems for Analysis of Dynamic Biological Pathways
8,048,644	11/1/11	Todd Steck, Helene Hilger Biological Indicator for Monitoring the Transport of Micro-organisms in the Environment
7,977,042	7/12/11	Charles Lee, Mark Clemens Composition and Method for the Restoration & Preservation of Transplant Organs Procured from DCD Donors
7,892,970 7,718,469	2/22/11 5/18/10	Mohamed-Ali Hasan Alternative Methods for Fabrication of Substrates and Heterostructures made of Silocon Coumpounds and Alloys
7,896,361	3/1/11	Jim Cuttino, John Shepherd Passive Vehicle Suspension System Providing Optimal Camber Gain
7,883,664	2/8/11	Gloria Elliott, Nilay Chakraborty Virtrified Composition which Preserves Biological Materials
7,856,320	12/21/10	Kayvan Najarian Methods and System for Gene Expression Array Analysis
7,855,046	12/21/10	Thomas J. Suleski Method and Apparatus for Fabricating Shaped Structures and Shaped Structures Including One- Two- or Three Dimensional Patterns Incorporated Therein
7,873,643	1/18/11	Mirsad Hadzikadic, Ben Bohren, Chris Eichelberger Incremental Clustering Classifier and Predictor
7,833,690	11/16/10	Ken Gonsalves Photoacid Generators and Lithographic Resists Comprising the Same
7,787,696	8/31/10	Bob Wilhelm, Rob Edgeworth Systems and Methods For Adaptive Sampling and Estimating a Systematic Relationship Between a Plurality of Points
7,776,505	8/17/10	Ken Gonsalves High Resolution Resists for Next Generation Lithographies
7,770,278	8/10/10	Matt Davies, K. Scott Smith Methods for Creating Assemblies and Disassembling
7,723,570	5/25/10	Ken Piller, Ken Bost Edible Human Vaccine Expressed in Soybeans
7,710,140	5/4/10	David Binkley, Rafic Makki; Tom Weldon; Ali Chehab Methods and apparatus for testing electronic circuits
7,657,406	2/2/10	Bill Tolone, Bill Chu Multi-Infrastructure Modeling System

2011 & 2010 patents from UNC Charlotte's OTT

OTT has been annually ranked in the top five universities by the Association of University Technology Managers® (AUTM) in a number of areas including:

- the number of startup companies per dollar of research,
- invention disclosures per dollar of research,
- the number of patents issued per dollar of research.

UNC Charlotte is listed in the top 10 universities in the number of deals completed per research dollar.

The latest published AUTM Survey listed UNC Charlotte's OTT as:

- 10th in the nation for number of license or option deals completed, 6th in the nation for number of inventions received,
- 2nd in the nation for number of patents filed, and
- 2nd in the nation for the number of new startup companies created.

(The statistics listed above are on a per dollar of research basis)

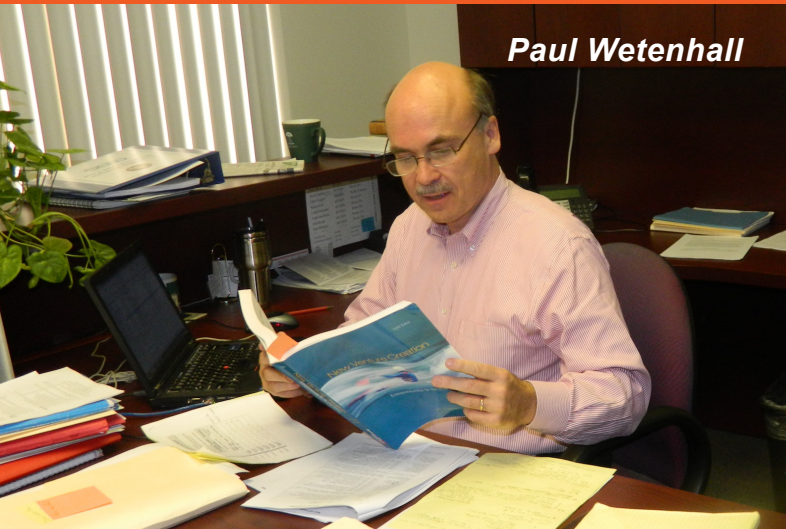
In fiscal year 2010, OTT filed 55 patent applications, received 37 invention reports, received 6 patents, and started 5 companies. In 2011 OTT filed 53 patent applications. The typical research university averages one startup for every \$50 to \$60 million in research performed annually. UNC Charlotte is creating one for about every \$6 to \$10 million in research.

For more information about the UNC Charlotte Office of Technology Transfer, please visit:
<http://research.uncc.edu/technology-transfer>

For more information about InfoSense please visit:
www.infosenseinc.net

INNOVATION IN ACTION: ENTREPRENEURSHIP PROGRAM

“Entrepreneurship is like nursing or music, you have to do it to learn it.” - Paul Wetenhall



Paul Wetenhall

Entrepreneurial Capitalism is the term Carl Schramm, CEO of the Kauffman Foundation, uses to describe the dynamic, interconnected system of government research funding, universities, startups and established companies. This system depends on two fundamental factors. First, innovation drives the productivity gains which improve America's standard of living. Second, entrepreneurs create the new ventures, especially those that grow rapidly due to their disruptive innovations, which generate 65% of net new jobs in America.

These broad concepts find tangible expression in the work of the Charlotte Research Institute (CRI) and the Ben Craig Center (BCC). The university research funded by corporate and government funding can lead to valuable products and services. This commercialization may be undertaken by established companies, or, in the case of more disruptive innovations, by startup ventures.

UNC Charlotte recognized the value of connecting the innovative capacity of the university with the economic impact of entrepreneurs when it established its incubator in 1986. It was one of the earliest universities to work with business partners to provide systematic support for early stage entrepreneurs. The effort led to game changing companies such as

Digital Optics built upon great ideas from UNC Charlotte researchers. That initial commitment has matured into an integrated approach to building companies that lead to the job and wealth creation necessary for a vibrant community.

At UNC Charlotte today, several organizations work together to ensure that the researcher's insights and inventions become the commercial products and services that benefit society. The commercialization process to the Office of Technology Transfer (OTT) (see page 15) As the invention is evaluated for possible patent protection, an initial market opportunity assessment is completed by CRI staff. This assessment influences the patent decision and begins the process of determining whether the path to market is a license to an established company or to a startup company.

The incubation program offered at the Center is available to assist the startup company. As indicated in the diagram (below), the Center offers a comprehensive set of services focused on building a successful venture. The foundation of the program is a learning community that strengthens the entrepreneur's expertise through events such as a monthly Venture Knowledge seminar. The Center staff works with each client entrepreneur to



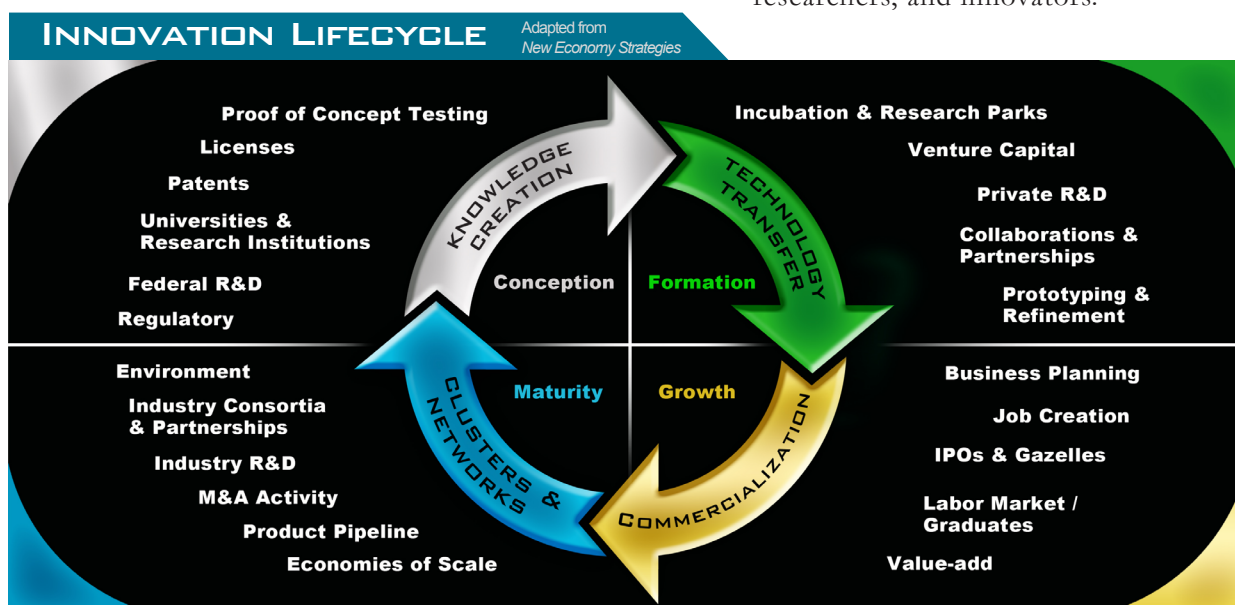
connect them to resources and partners throughout the community and at the university. Most importantly, the incubation program provides customized, in-depth coaching and mentoring for client companies. The intent is to accelerate progress, overcome barriers, and, when necessary, provide the honest feedback needed to re-direct efforts. Since its inception in 1986, the incubation program has served companies from throughout the Charlotte area regardless of university connection. The Center staff is currently working with over twenty client companies including three that involve UNC Charlotte faculty or technology.

As UNC Charlotte's research efforts have grown and as additional academic entrepreneurship courses have been offered, the Center has responded by increasing engagement with the campus. It recently partnered with CRI and OTT to introduce a Commercialization Knowledge seminar series (see page 23) designed for faculty and graduate students with an interest in bringing their innovations to market. This ongoing series will help our researchers become commercialization savvy. A major campus-related initiative is the January launch of a student incubator at the Center. Eligible juniors, seniors, graduate students can apply for admission. If accepted, they can locate their business in the freshly remodeled space (think ping pong, creative spaces, and green paint!) at no charge for an initial period. They will receive full incubation services and will be expected to achieve milestones. Student businesses can participate for up to 18 months. The student incubator seeks to provide a great learning experience for all participants while identifying and launching promising businesses. As the Center intensifies its engagement with UNC

Charlotte's faculty and students, it is also extending its role to champion the Charlotte region's innovation and entrepreneurship ecosystem. The Center's staff is collaborating with CRI staff to expand the Five Ventures business competition into a major event known as the Charlotte Venture Challenge. This will become Charlotte's premier event for identifying the region's best new entrepreneurs. It will offer significant cash awards and investor visibility which is expected to attract entrepreneurial talent from throughout the Southeast. The Center will lead other collaborative efforts beginning in 2012 designed to build an integrated, strong support system for the Charlotte region's high growth entrepreneurs.

UNC Charlotte will offer expanded support for innovation when the PORTAL building (Partnership, Outreach and Research to Accelerate Learning) opens in late 2013. It will facilitate the intersection of academic research, corporations, and entrepreneurs. The architectural design will enable new forms of collaboration across disciplines, more of an "innovation center" than incubator. PORTAL will be a place to experiment with new approaches to commercialization and venture creation. And, the campus location will enable increased student entrepreneurial engagement.

The Ben Craig Center is the University's focal point for research commercialization assistance, for support of startup ventures, and, with the new student incubator, for real world experiences for our talented, emerging entrepreneurs. As its initiatives unfold, it will become a catalyst for a regional economy strengthened by the business ventures that grow from creative collaborations of entrepreneurs, researchers, and innovators.





A UNC CHARLOTTE
BUSINESS PARTNERSHIP

The Ben Craig Center

“I hope that the impact of our program is that...they achieve greater success faster than they would otherwise.”

—Dr. Jon Benson, Founding Director (1986-1998), December 1991

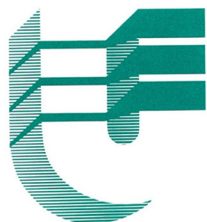


Ben T. Craig

Paul Wetenhall

Jon Benson

Mark Schaffner



The University Business Incubator Center



THE BEN CRAIG
CENTER
A University/Business Partnership



Above Left: Portrait of Mr. Ben T. Craig, founding board chairman of the University Business Incubator Center
Above Right: Current BCC president Paul Wetenhall, and former BCC presidents Jon Benson, and Mark Schaffner
Left: Previous BCC logos & 25th logo

Celebrates 25 Years

The UNC Charlotte business incubator, the Ben Craig Center celebrated 25 years of service to entrepreneurs with a November 17, 2011 reception that honored clients, board members, and supporters. A university sponsored business incubator was a new idea in 1986 when the UNC Charlotte Urban Institute proposed the concept. Community leaders, including banker Ben Craig, embraced the initiative. That initial commitment has grown to include over 100 Charlotte leaders who have served as directors over the Center's history.

Chancellor Emeritus Woodward, all of the Center's living board chairpersons and many founders of the Center's 123 entrepreneurial ventures returned for the celebration. All four of the Center's directors participated including founding director, Dr. Jon Benson ('86 -'98), who traveled from Wyoming; Mr. Mark Schaffner ('98 -'07); Mr. Ross Annable ('07-'08 interim); and Mr. Paul Wetenhall ('08-current).

Chancellor Philip Dubois, vice chancellor Robert Wilhelm, and outgoing Center board chairperson Harrison Marshall shared remarks that recalled entrepreneurial successes and the University's consistent commitment. Incoming board chairperson Doug Dawson, a UNC Charlotte graduate and founder of former Ben Craig Center company Optinfo, recognized long-serving volunteers.

The evening included the unveiling of historical displays recognizing the Center's mission to "create & innovate, incubate & accelerate and graduate." Guests received the newly released Twenty-Five Year History booklet. Please contact the Center at, csmith@bencraigcenter.com for a copy.



COMMERCIALIZATION KNOWLEDGE SERIES

COMMERCIALIZATION OPPORTUNITIES & PITFALLS

WEDNESDAY, FEBRUARY 8, 2012

1:00 PM - 2:30 PM

BIOINFORMATICS, ROOM 217

PLEASE REGISTER YOUR ATTENDANCE

BY SENDING YOUR CONTACT

INFORMATION TO RUTH BURNETT

RABURNET@UNCC.EDU OR 704 687-8015

NOTE: PLEASE CONTACT DEVIN COLLINS
AT DEVIN.COLLINS@UNCC.EDU WITH ANY
QUESTIONS PERTAINING TO THIS SERIES.

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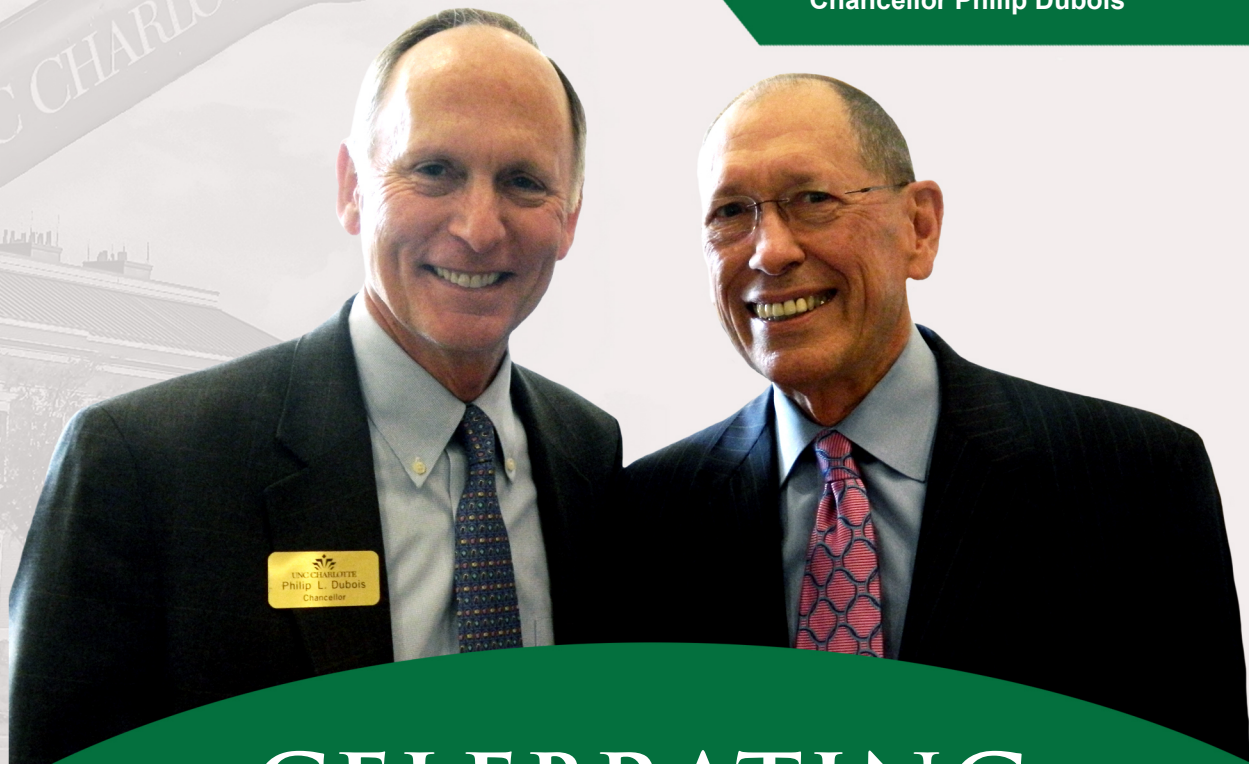
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STAKING OUR CLAIM IN THE FUTURE

Dr. Steve Mosier (right) is shown below at his retirement celebration with UNC Charlotte Chancellor Philip Dubois



CELEBRATING LEGACY

December 2011 brought a close to a year of transition for the Office of Research and Federal Relations and the Charlotte Research Institute, but a new beginning for the Office of Research and Economic Development at UNC Charlotte.

With the December retirement of Steve Mosier, who served for 14 years as Vice Chancellor for Research and Federal Relations, Bob Wilhelm begins 2012 building on the legacy of Mosier, who created the university's research administration program and who oversaw dramatic growth in the university's extramural funding as UNC Charlotte made the transition from a master's institution to a doctoral granting research university.

In Wilhelm's appointment to Vice Chancellor for Research and Economic Development at UNC Charlotte by the UNC Board of Governors, he becomes the chief research officer for the university. In this position Bob continues to hold the position of Executive Director of the Charlotte Research Institute and work with our faculty members and partners to advance the quality, diversity and growth of research at UNC Charlotte to directly impact social, cultural, and economic communities. He will carry on leading university-wide efforts for university-business partnerships, manage business access to the campus, and direct campus community based programs for entrepreneurship and economic development.

RESEARCH

THE CORE OF DEFENSE



The University of North Carolina at Charlotte focuses on applied research for industrial and governmental agency partnerships in engineering, science, and computing areas including precision metrology, advanced manufacturing, optoelectronics, energy, sustainable design, visualization, cyber security, bioinformatics and biomedical engineering.